

CLAIMS

What is claimed is:

- 5 1. An apparatus for optical pulse characterization, said apparatus comprising:
- a modulator receiving optical pulses;
- a spectrometer receiving output from said modulator;
- a detector receiving output from said spectrometer;
- a phase shifter receiving a gate pulse and providing output to said
- 10 modulator; and
- information processing means receiving output from said detector
- and providing commands to said phase shifter.
2. The apparatus according to claim 1 wherein said apparatus characterizes
- 15 optical pulses as to one or more of the group consisting of intensity, phase, dispersion,
- polarization states, chirp, and non-linear effects.
3. The apparatus of claim 1 wherein said modulator is phase-locked to a train of
- the optical pulses.
- 20 4. The apparatus of claim 3 wherein said phase shifter provides a same effect
- as adjusting a time delay between the optical pulses and the gate pulse.
5. The apparatus of claim 1 wherein said information processing means
- 25 comprises frequency-resolved optical gating means.
6. The apparatus of claim 5 wherein said frequency-resolved optical gating
- means makes no constraint between optical pulse and gate pulse.

7. The apparatus of claim 6 wherein a spectral constraint is applied to said frequency-resolved optical gating means.

8. The apparatus of claim 5 wherein said information processing means additionally comprises principal components generalized projections means.

9. The apparatus of claim 8 wherein said principal components generalized projections means employs a spectral constraint.

10. The apparatus of claim 1 wherein said modulator is selected from the group consisting of an intensity modulator and a phase gate.

11. A method for optical pulse characterization, the method comprising comprising the steps of:

15 receiving optical pulses via a modulator;
receiving output from the modulator via a spectrometer;
receiving output from the spectrometer via a detector;
receiving a gate pulse via a phase shifter and providing output to the modulator; and
20 receiving output from the detector via information processing means and providing commands to the phase shifter.

12. The method according to claim 11 additionally comprising the step of characterizing optical pulses as to one or more of the group consisting of intensity, phase,
25 dispersion, polarization states, chirp, and non-linear effects.

13. The method of claim 11 additionally comprising the step of phase-locking the modulator to a train of the optical pulses.

14. The method of claim 13 wherein the phase shifter provides a same effect as adjusting a time delay between the optical pulses and the gate pulse.

5 15. The method of claim 11 additionally comprising the step of employing the information processing means to perform frequency-resolved optical gating.

16. The method of claim 15 wherein the frequency-resolved optical gating makes no constraint between optical pulse and gate pulse.

10 17. The method of claim 16 wherein a spectral constraint is applied to the frequency-resolved optical gating.

15 18. The method of claim 15 additionally comprising the step of employing the information processing means to perform principal components generalized projections.

19. The method of claim 18 wherein the principal components generalized projections employs a spectral constraint.

20 20. The method of claim 11 wherein the modulator is selected from the group consisting of an intensity modulator and a phase gate.

21. A vector optical spectrum analyzer comprising:

a modulator receiving optical pulses;

a spectrometer receiving output from said modulator;

a detector receiving output from said spectrometer;

5 a phase shifter receiving a gate pulse and providing output to said modulator;

information processing means receiving output from said detector and providing commands to said phase shifter; and

10 a clock recovery circuit providing said gate pulse to said phase shifter.

22. The vector optical spectrum analyzer of claim 21 additionally comprising a switch providing input to said spectrometer alternatable between output of said modulator and optical pulses as received by said modulator.

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23. The apparatus of claim 5 wherein gate is known.

24. The method of claim 15 wherein gate is known.

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